

LIFE HISTORY STRATEGIES AND INDIVIDUAL VARIATION
IN MEN'S DESIRE TO APPEAR MUSCULAR

A THESIS SUBMITTED TO THE GRADUATE DIVISION OF THE UNIVERSITY OF
HAWAII AT MĀNOA IN PARTIAL FULFILLMENT OF THE REQUIREMENTS FOR THE
DEGREE OF

MASTER OF ARTS

IN

COMMUNICOLOGY

DECEMBER 2017

By

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Keywords: Life history theory, self-presentation, male muscularity, evolutionary psychology

Abstract

Self-presentation has been widely studied by scholars interested in verbal and nonverbal communication. Within a mating context, previous theories of emphasize the motive of appearing physically attractive. However, people are unlikely to adopt identical strategies to present themselves as attractive, but previous theories cannot explain this variation. I propose and test in this research a life history (LH) hypothesis of self-presentation using male muscularity as a test case. Previous research showed that American men generally desire to be more muscular, and I argue that American young adults desire to be differentially muscular depending on whether they adopt a fast or slow LH strategy. I tested this hypothesis by assessing in a survey American adult men's LH strategy and their desired level of muscularity. Analyses revealed a significant positive correlation between depression (measuring the *K*-dimension of LH strategy) and men's desires for muscularity (compared to their baseline muscularity) when they were considering a short-term but not a long-term relationship. There was no evidence that measures of mate competition (another major dimension of LH strategy) correlated with desires for muscularity for either short-term or long-term relationships. These findings provided partial support for the LH hypothesis of men's desires for muscularity.

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Chapter 1: Introduction

Self-presentation, the attempt to influence how others perceive oneself by changing one's own behaviors and appearance, is a pervasive communicative phenomenon (Schlenker, 1980; Schneider, 1981; Jones & Pittman, 1982; Leary & Kowalsky, 1990). The way people choose to be seen, heard, felt, and even smelled by others all convey information about themselves. This information facilitates attaining goals important to oneself, such as to land a job, obtain a loan, and to initiate and maintain personal and professional relationships. A generic way to achieve those goals, according to many self-presentation theories, is to make a positive impression on people (Vohs, Baumeister, Ciarocco, 2005). In the mating context, the focus of this research, this will mean for men and women to appear physically attractive (in addition to presenting other qualities). However, people differ in their standards of physical attractiveness (Frederick & Haselton, 2007). Thus, even with the same mindset of appearing physically attractive, people are likely to adopt different self-presentation strategies depending on their conception of the kind of physical features that are considered to be attractive. Are those standards and thus the subsequent self-presentation strategies that people adopt random or patterned?

This research addresses this question by examining what correlates with men's desire to appear more, or less, muscular. Muscularity is one of many factors that influence men's attractiveness, and across both sexes, more muscularity is generally considered to be more attractive than less muscularity (Yanover & Thompson, 2010). Evolutionarily speaking, male muscularity signals genetic quality and the ability to provide resources and protection of one's partner and offspring (e.g., Frederick and Haselton, 2007, Puts 2010). In a cross-cultural study, Frederick et al. (2007) examined men's perceptions of muscularity in relation to their self-reported muscularity, what they consider to be attractive, and for what purposes they desire to be

muscular. Results showed that 91-96% (from samples of California and New York) of American men would like to be more muscular, suggesting a discrepancy between respondents' perceived current level of muscularity and desired level of muscularity. For example, New York respondents reported an average ideal level of muscularity of about 4.95 on an eight-point silhouette scale. The average variability (measured by standard deviation) is about 1.10. In other words, some respondents desired a very high level of body muscularity (7 on an eight-point scale; see Appendix 2) whereas others wanted a much lower level of body muscularity (e.g., 3 on an eight-point scale). What explains this variability in American men's desired level of body muscularity?

In this research, I address this question by drawing on life history (LH) theory (see Roff, 1992; Stearns, 1992; Charnov, 1993), an influential evolutionary biological theory. This theory is on the strategic allocation of biogenetics to different life functions (e.g., somatic maintenance, growth, or reproduction) in different stages of life. This theory has been successfully applied to studying many aspects of human psychology and behavior, including mate selection (e.g., Buss, 1989), financial risk management (e.g., Apicella et al., 2008), and personality characteristics (e.g., Figueredo et al., 2004; Gladden et al., 2009). I extend this line of research by examining how the adoption of what is called a fast or slow LH strategy will influence men's intent to appear more, or less, muscular in the mating context, depending on whether men are thinking about a long-term or a short-term relationship. The general hypothesis is that, to the extent that men (and women) who adopt a faster LH strategy prioritize reproduction over somatic maintenance and growth (e.g., Rushton, 1985), and to the extent that greater body muscularity increases men's mating success (particularly in obtaining short-term mates), men adopting a faster LH strategy should desire to appear more muscular (relative to their current muscularity

level).

In the following sections, I will first define self-presentation in relation to impression management, two terms often used interchangeably. I will then review previous work on the relation between nonverbal behavior and self-presentation. I will then elaborate a LH explanation of men's desire for body muscularity. Following that, I will provide the results of the described survey. These results will be followed by a discussion of said findings, consisting of speculation to explain unexpected data, and what these data mean to the greater fields of impression management and evolutionary theory.

Chapter 2: Prior Theories on Self-Presentation and Impression Management

2.1 Self-Presentation and Impression Management

Self-presentation and impression management are two related but distinct constructs, but they are sometimes used interchangeably when they perhaps should not be. Goffman (1956) apparently equated self-presentation to impression management. In his seminal work *The Presentation of Self in Everyday Life*, Goffman (1956) argued from a dramaturgical perspective that, as stage performers, people assuming different social roles (e.g., doctors and patients) collectively define a situation by managing their impressions in front of others according to social norms or an idealized self. This management of self-image presents some aspects of self while concealing others, and different presentations create different impressions, thereby supplying different and sometimes competing definitions of the same situation that suit one's needs. Through this negotiation facilitated by impression management, people provide information of themselves (the "constructed self" to be more precise), extract information of others and the situation, and reach a "working consensus" (p. 4) that allows the social interaction to proceed. According to Goffman (1956), people also create impressions of themselves

according to their aspirations. These aspirations stem from an assumption that individuals with moral character expect others to treat the individual in a corresponding manner. In other words, an individual has assumptions as to how interactions should go based on how the individual perceives him or herself, as well as how the individual perceives he or she should be. Thus, impression management under Goffman's (1956) treatment is a self-focused process, that is, an activity performed by people to make themselves appear differently.

As a social psychologist, Higgins (1987) elaborated on Goffman's (1956) work with greater focuses on the construct of "self." Specifically, Higgins (1987) articulated these perceived differences among self-concepts in his self-discrepancy theory. Specifically, he articulates three domains of the self: actual, ideal, and ought. The actual self is the attitudes, beliefs and abilities that either the individual or others perceive the individual to have. The ideal self is the attitudes, beliefs, and abilities that the individual or other desires the individual to have. The ought self is the attitudes, beliefs, and abilities that the individual or other entity thinks that the individual should have. The ought dimension of self differs from the ideal self in that the ideal self describes what are desired or wanted, while the ought self considers responsibilities or obligations. Thus, self-presentation according to norms and expectations, similar to Goffman (1956), is driven by a discrepancy between actual and ought self, and self-presentation due to aspiration or idealization is driven by a discrepancy between actual and ideal self.

Making clearer distinctions between impression management and self-presentation, Schneider (1981) suggested that an individual may manage the impression of an entity that is not their own, such as a marketing consultant creating advertisements for a client, and this would not be considered *self*-presentation. Schneider (1981) further articulated self-presentation as a tactical decision made by an individual to affect the behaviors and perceptions of others. In other

words, self-presentation decisions are made in an attempt to manipulate how other individuals behave and perceive the individual. Also differentiating self-presentation from impression management, Jones and Pittman (1982) argued that the former is a subcategory of the latter, and defined self-presentation as “those features of [an individual’s] behavior affected by power augmentation motives designed to elicit or shape others’ attributions of the actor’s dispositions” (p. 233). Sharing this perspective, Leary and Kowalski (1990) argued that impression management is a more general term than self-presentation, as impressions can be managed by third-parties (e.g., a mother dressing up her child), whereas self-presentation is people managing their own impressions as they see important. Focusing specifically on the notion of self-presentation, Baumeister (1982) further classified self-presentation into two separate categories: self-presentation and self-construction. Self-presentation is motivated by the pleasure of the audience, targeting the audience’s perceptions and desires to manipulate a response, while self-construction is motivated by the management of the distinction between the private and public selves.

In sum, while some researchers used impression management and self-presentation interchangeably, they are best treated as distinct, but related concepts, where self-presentation is a subcategory of impression management behaviors. In this thesis, I maintain those distinctions and focus on self-presentation. I will follow researchers’ choices of words when describing their models, but will note whether the researchers meant impression management or self-presentation.

2.2 Motives of Self-Presentation

Baumeister (1982) argued that a primary motive for self-presentation is to please a particular audience, or to impress the audience by expressing one’s good qualities. Baumeister

(1982) elaborates on these motivations, suggesting that self-presentation is motivated by conformity (so long as the individual does not appear to be yielding), thus maintaining social bonds, and allowing for future influence. Both pleasing and impressing the audience, as well as conforming while maintaining individuality, are means of establishing a means of extracting resources from the relationship. Baumeister (1982) also argues that expression of individuality itself, regardless of conformity, is a motivation of self-presentation behaviors. These individual-oriented actions can result in aggression, and otherwise receiving evaluations from others, thus being audience-oriented.

Leary and Kowalski (1990) argued that people self-present to a) maximize one's reward-cost ratio in social interactions, b) enhance one's self-esteem, and c) facilitate the development of desired identities. At the same time, self-presentation is constrained by five factors: 1) the individual's self-concept, 2) their desired and undesired identity images, 3) their role constraints, 4) the audiences' values, and 5) the individual's social image. Self-concepts constrain self-presentation as the images that people try to project should generally be consistent with how the individual wishes to view themselves. Desired and undesired images constrain self-presentation because an individual is motivated to promote a desired self-image (see also, Higgins, 1987). Audiences' values constrain self-presentation because to successfully present a favorable image, the presented image must be tailored to be consistent with the target's values. Role constraints are related to self-presentation because the individual is limited by social roles imposed on him or her. Finally, people's current or potential social image constrains self-presentation because people are unlikely to engage in behaviors that are inconsistent with information others already have about them.

Jones and Pittman (1982) propose that self-presentation is motivated by the motives of

acquiring, augmenting, and maintaining social power in social interaction. These goals are achieved by five behavioral strategies: intimidation (e.g., to be perceived as dangerous), ingratiation (e.g., to be perceived as likeable), self-promotion (e.g., to appear competent), supplication (e.g., to reinforce a power distinction between audience and individual in an attempt to engender aid from the more powerful audience), and exemplification (e.g., to appear honest and humble).

Vohs, Baumeister, and Ciarocco (2005) proposed a self-regulation hypothesis of self-presentation. The theory posits that self-presentation can be cognitively demanding depending on whether the “presenter” is familiar with the image they are going to present. Specifically, self-regulation refers to “the ability to alter the self’s responses” (p. 633), and it is a form of resource that has to be spent to perform a task (in this case, to present oneself in a certain way). It follows that presenting oneself in an unfamiliar way (i.e., a difficult task) will consume more regulatory resources compared to presenting oneself in a familiar way.

Supporting this hypothesis, Vohs et al. (2005) showed that participants’ performance on physically or cognitively demanding tasks (e.g., hand-grip stamina test) decreased after they were asked to present an image that was inconsistent with their self-identity (e.g., requested that participants interact in a manner inconsistent with their gender) or in front of a skeptical audience. In follow-up experiments, they found that participants were less capable of appropriately present themselves to a friend or to a stranger after performing cognitively demanding tasks.

The work reviewed so far suggests that self-presentation is a type of social behavior maintained by regulatory resources (Vohs et al., 2005). The use of valuable regulatory resources to influence the ways that others perceive oneself is derived from social norms (Goffman, 1956),

the motive of pleasing others (Baumeister, 1982), the discrepancies between the actual self and ideal self (Higgins, 1987), and the motive to obtain and maintain social power (Jones & Pittman, 1982).

In the context of male muscularity, the above social-psychological theories of self-presentation suggest that men desire a more muscular body. For reasons that will become clear in the proceeding sections, muscularity allows males to signal that they have an ability to inflict cost and extract resources, would reduce cognitive effort of presenting oneself in such a manner, and is also considered a valuable (i.e., attractive) trait in the context of a short-term, sexual relationship.

2.3 A Female-Choice Explanation of Men's Muscularity Self-Presentation

Sexual selection theory (Darwin, 1871; see for a modern synthesis, Andersson, 1994) suggests another motive of men desiring to appear muscular, that is, to attract women as mates. Sexual selection theory posits that extravagant traits that seemingly undermine survival (i.e., handicapping traits; e.g., peacocks' tails and red deer stags' antlers) evolved because they increase one's mating success (e.g., attracting and retaining mates). Compared to females, males are more likely to develop handicapping traits because males typically face more intense mating competition than females (e.g., Andersson, 1994, Puts 2010). This is because males generally reproduce faster than females and, as a result, there are more reproductively available males than females at any given moment in the mating pool. Thus, males' reproductive success largely depends on monopolizing the access to females, and, to achieve this goal, males can either be more physically dominant (so that they can repel other males from competition, preemptively through intimidation or through physical conflict) or more attractive to females. The costly traits fulfil either or both of the functions (Andersson, 1994; Darwin, 1871; Puts, 2010).

Men, on average, reproduce faster than women (Puts, 2010), and, due to the resulting increased intrasexual competition, are taller, physically stronger, faster, have more prominent facial hair, have deeper voices, and are generally more competitive than women (e.g., Sell, Cosmides, Tooby, Sznycer, von Rueden, & Gurven, 2009). Those traits are generally believed to enhance men's attractiveness to women, especially when women are considering a short-term relationship. This is because these cues can be treated as indicators of genetic quality and health in a potential mate (e.g., Gangestad and Buss, 1993; Buss & Shackelford, 2008). For example, in a study on the effects of pitch on male attractiveness, Feinberg et al. (2003) found that female participants rated lower male voices as more attractive, older, and larger than higher pitched voices. Similarly, Puts (2005) found that lower-pitched male voices were considered to be more attractive to women. However, low-pitch voices were rated most attractive (and high-pitch voices least attractive) to women during their most fertile phase of the ovulatory cycle.

More relevant to the present research, Frederick and Haselton (2007) conducted a study specifically assessing women's perceptions on male muscularity. They surveyed 286 women regarding their perceptions of avatars of different physical builds (Appendix 2), gauging how likely they (the avatars) were to engage in certain behaviors (e.g., be unfaithful) as well as how the subject perceived this avatar (e.g., sexually attractive or physically dominant). The researchers showed that women generally find more muscular men to be more attractive – but only to a certain extent. Women's attraction to hyper-muscular men drops, resulting in an inverse-curvilinear relationship between muscularity and perceived attraction. This low valuation of hyper-muscularity is presumably because hyper-muscular men pose immediate physical threats to women. Instead, the males considered most attractive were those of moderate muscularity.

Given these findings, a female-choice explanation of male muscularity self-presentation suggests that men desire to appear more, or less, muscularity depending on their perceptions of women's preference for muscularity. The stronger the perceived female preference, the stronger the desire for men to appear muscular. While this is a plausible explanation, we consider here a complimentary mechanism that focuses on the effect of men's life history strategy on their desire to be differentially muscular.

Chapter 3: Life History Theory

Life history (LH) theory concerns how organisms strategically allocate finite resources to different life activities to maximize individual reproductive success (Rushton, 1985; Charnov, 1993; Roff, 1992; Stearns, 1992). The two major activities are somatic effort and reproductive effort. Somatic effort includes maintenance, which is to perform the most basic and necessary life functions (e.g., respiration), and growth, which is the development of the body and mind following the local, age-specific natural maturation. On the other hand, reproductive effort includes all activities directly related to passing genes to the next generation, including mate attraction, competition, and retention as well as parental investment. In other words, somatic efforts strive for the survival of the individual organism (in preparation for future reproduction), while reproductive efforts emphasize immediate reproduction.

While both somatic and reproductive efforts aim to achieve reproductive success, when to invest resources into which function has diverging effects on for the organism. Specifically, investing primarily into reproduction leads to early and fast reproduction and increased offspring quantity. The tradeoff is the removal of available resources (e.g., time, energy) for maintenance and growth, resulting in poorer overall condition for adults and offspring. For example, women who have their first children at earlier ages are typically less educated and of lower

socioeconomic status (e.g., being more likely use social welfare programs; Coley & Chase-Lansdale, 1998). Children of teenage mothers are also less likely to pursue higher education, and are also victims of poorer nutritional quality than children of older mothers (Vereecken, Keukelier, & Maes, 2004).

At the same time, as the quantity of offspring increase, each offspring receives less parental investment. Walker et al. (2006) analyzed a series of 22 small-scale societies that varied in resource scarcity. They found that females in places with more scarce resources became reproductively active sooner. These societies also had higher adolescent mortality rates, indicating poorer offspring quality. The surviving children of these women also had overall smaller adult body size. These results provide evidence for the tradeoff between investment in somatic efforts and reproductive efforts as LH theory predicts.

Alternatively, an individual can choose to primarily invest in somatic function at the expense of immediate reproduction. This strategy increases individual's overall condition and their social competence (e.g., through more education). Investment of resources into growth leads to quality not just of the individual, but also investment of resources into quality of offspring. Thus, investment of resources into somatic function results in a long-term (albeit slower) increase of the organism's reproduction success. The cost, however, is that they may die due to extrinsic mortality factors before their first reproduction. Thus, these individuals can be very well prepared for reproduction, but they may still fail by the standard of natural selection (i.e., one's success in passing copies of his/her own genes to the next generation).

An animal's LH strategy can be described as either slow or fast. Individuals with a fast LH strategy will reproduce early and often, increasing the number of offspring, reducing the amount of parental investment, and increasing the rate of reproductive maturation at the cost of

mature body size. An organism with a slow LH strategy will do the opposite, valuing later investment into fewer, but higher quality offspring, leading to lower numbers of offspring, increasing parental investment, and decreasing the rate of reproductive maturation, and thus resulting in a greater mature body size.

The adoption of a fast versus slow LH strategy is contextual, depending on ecological harshness and unpredictability (Brumbach, Figueredo, & Ellis, 2009). A harsh environment is one with fewer resources for one's survival and reproduction, whereas an unpredictable environment is one in which the availability of resources varies randomly. Generally, individuals living in harsher and more unpredictable environments are more likely to adopt a fast LH strategy because this avoids death before first reproduction (Brumbach et al., 2009). At the same time, by increasing offspring quantity, parents are able to distribute the survival risk of the offspring over a greater number, rather than total investment into a single offspring that may not survive. Conversely, individuals living in better environments (e.g., safe and stable) are more likely to adopt a slow LH strategy because the individual's experience has shown a likelihood to reach maturation.

In addition to the contextual variability in LH strategies, people also differ in their predisposition to adopt a faster versus slower LH strategy. According to differential k theory (Rushton, 1985), a so-called " K -factor" is an underlying factor for many intra-species, heritable variations between individuals. Derived from population biology, the r - k continuum refers to a spectrum based on population growth (or ' r ,' representing the sum of the population birth rate and immigration, minus the sum of the death rate and emigration) and the carrying capacity of the environment, or maximum density of individuals an environment's resources can maintain (' k '). This continuum is often used by LH theorists, and species that can be identified as falling

on the ‘*r*’ end of the continuum have traits that reflect faster LH strategies, and species that fall on the ‘*K*’ end of the continuum have traits that reflect slower LH strategies. Rushton (1985) argued that these distinctions can be applied to intra-species differences as well.

Supporting the theory, Figueredo et al. (2006) developed a *k*-factor measure (e.g., “I often get emotional support and practical help from my blood relatives”) and found that people who scored higher on the *k*-index (i.e., adopting a slower LH strategy) were generally risk averse and less impulsive. Figueredo et al. (2005) argued that the *k*-factor is an overarching personality trait that correlates parental investment, closeness with paternal figure, attachment to romantic partners, Machiavellianism, and risk-taking attitudes. In this study I focus on the effect of trait-like differences in the adoption of different LH strategies on men’s self-presentation in relation to muscularity.

3.1 Life History Strategies and the Desire to be Muscular

The general hypothesis of this research is that men who adopt a fast LH strategy, compared to their slow counterparts, value body muscularity more and are thus more motivated to make themselves appear more muscular. Critically, men who adopt a fast LH strategy value body muscularity more because higher levels of body muscularity render them physically stronger, and greater levels of physical strength enable the “faster” men to live the kind of life they prefer, which is characterized by higher levels of mate competition (Figueredo, Gladden, & Beck, 2011). In other words, being more muscular is a means through which men who adopt a fast LH strategy to achieve reproductive success. This evolved preference is then manifested as a desire to appear, or self-present, as more muscular.

Specifically, men who adopt a fast LH strategy face more intense mating competition because they tend to (compared to their slower counterparts) reproduce earlier, in shorter

intervals, and have more sexual partners (Ellis et al., 2012). This is because, as described previously, even though any given population is evenly split between males and females, females largely invest more in their offspring, ultimately leading to more males in the active breeding population than females. Thus, the commoner sex (i.e., males) are motivated to engage in more intrasexual competition. Indeed, Figueredo et al. (2010) showed that the adoption of a faster LH strategy correlates with stronger short-term mating orientation (e.g., to have sex before showing commitment), which in turn correlates with physical build. Muscularity can be fundamentally understood as a means of inflicting costs upon others, while minimizing the costs to oneself, to achieve a goal. Further, muscularity in men is largely considered to be more attractive (e.g., Frederick & Haselton, 2007; Archer & Thanzami, 2007; Sell, Tooby, & Cosmides, 2009). Sell, Tooby, and Cosmides (2009) show not only that more muscular men consider themselves to be more attractive, they are also more quick to anger. Anger and aggression are evolutionary tools that are heavily correlated with muscularity and push an individual to take advantage of those physical features. Buss and Shackelford (1997) suggest that there are seven problems that aggression functions as an adaption to alleviate: co-opting the resources of others, defending against attack, negotiating status and power hierarchies, deterring rivals from future aggression, deterring mates from sexual infidelity, and reducing resources expended on genetically unrelated children. Of primary interest to this study are the reasons relating to intrasexual contest: co-opting resources, defending against attack, and deterring rivals from future aggression.

Aggression is heavily correlated with short-term relationship strategies, and therefore, a fast LH strategy. For example, Figueredo, Gladden, and Beck (2011) explicitly hypothesized that men adopting a faster LH strategy are more likely to commit intimate partner violence, which is fundamentally due to the motivation and ability to achieve a goal. The researchers describe fast

LH strategists' goals within relationships to be, by definition, mutually incompatible with a female's goal of the relationship. Violence is a strategy employed to force submission to an individual's goals. Further, Gladden, Sisco, and Figueredo (2008) predicted that certain personality characteristics measured by the mini-*k* scale lend themselves to a "protector" (slow) LH strategy. They conducted a study and found that slow LH indicators were predictive of fewer self-reports of intimate partner violence. Also, in an international study surveying university students from 17 countries, Strauss and Savage (2005) found evidence suggesting that experiencing childhood neglect (an indicator for fast LH strategies) is predictive of engaging in intimate partner violence.

Despite the benefits of aggression, it is also costly. Potential rivals do not accept cost-inflicting attempts passively, and will attempt to inflict their own costs upon the individual (Buss & Shackelford, 1997). A primary factor that will bias the cost-benefit analysis in favor of the aggressor is physical strength. Only physically strong men should be able to inflict these costs on others, while withstanding the attempts of rivals. Muscularity is an indicator of physical strength; not only does it demonstrate to others how much physical strength an individual has, but increased muscle mass also makes the individual actually stronger. Sell, Tooby, and Cosmides (2009) conducted a study comparing an individual's various ratings of physical strength using four weightlifting activities and the individual's proneness to anger. The researchers found that stronger men are more prone to anger, suggesting that anger as a tool is more successful and more easily advantaged by more muscular individuals. Archer and Thanzami (2007) also conducted a study comparing physicality (physical measurement of participants' bodies) with aggression, and similarly found that all measures of physicality were correlated with direct aggression. Thus, if being aggressive is a manifestation of adopting a fast LH strategy, and

muscularity enables men to afford being aggressive (i.e., being successful in inflicting costs on others while not being injured by others), it would follow that men who adopt the fast LH strategy will value masculinity more and present themselves in a way that enhances said muscularity.

Research also shows a significant relationship between adopting a faster LH strategy and being more prone to risk-taking behaviors. Griskevicius, Delton, Robertson, and Tybur, (2011) found correlations between mortality and reproductive timing, attitudes toward reproduction, desired age of reproduction, and value of higher education, as well as replicating previous findings relating LH strategies and socioeconomic status and neighborhood violence (i.e., frequency of violent crimes, perceived police efficacy and presence, etc.). Participants were asked a series of questions relating to willingness to take risks after a mortality prime (or a control, in which there was no stimulus). The results suggest participants with a lower childhood socioeconomic status were significantly more likely to engage in more frequent risk taking behaviors after the mortality prime than participants with higher childhood socioeconomic status. Similarly, Wilson and Daly (2004) found that priming (specifically males) with an attractive female face predicts greater risk-taking tendencies in a risk assessment questionnaire. These results suggest that cues directly related to current reproductive opportunity lead to the activation of a fast LH strategy.

Further elaborating on phenotypic distinction and behavioral variation across LH strategies, Apicella et al. (2008) showed a positive correlation between testosterone and taking financial risks. Similarly, in a gendered comparison of financial risk and career choice, Sapienza, Zingales, and Maestripieri (2009) found that comparatively high testosterone levels, between sexes, predicted not only immediate less financial risk aversion, but also long term career choices

into high-risk financial careers (subjects were undergraduate business majors). These data suggest a physiological response to testosterone in decreased risk aversion, rather than a socialized gender difference. Testosterone, being the male sex hormone, stimulates masculine typical traits such as facial hair growth as well as muscle growth and aggression. This relates to the present study as testosterone is a hormone that promotes fast LH traits.

In sum, men adopting a fast LH strategy are more aggressive and risk prone for adaptive reasons (e.g., to maximize immediate reproductive opportunity). Being more aggressive and risk-taking, in turn, correlate with higher levels of muscularity or testosterone that is critical in synthesizing muscles, thus achieving the goal of enhancing immediate reproductive success. Given fast strategists' goal is to maximize immediate reproductive success, they should have stronger desire (than slow strategists) to appear muscular. In other words, I predict that faster LH strategies will correlate with stronger desires for muscularity among men. This is the focal hypothesis to be tested.

Chapter 4: Method

4.1 The Sample

Respondents were 103 male adult Americans (median age = 30, ranging from 20 to 68) recruited from Amazon's Mechanical Turk (MTurk). MTurk is an online tool that allows for gathering of data from a sample based on certain specifications of the researcher. In the present study, eligibility of participants was predicated on being male (as is of primary interest to the research), having a 95% or greater approval rate, and having participated in over 5000 surveys (the final two qualifications being indicators that potential participants take these surveys seriously). Ethnically, 70.5% of participants identified as "White," 11.4% identified as "Latin American," 7.6% identified as "African American," and another 7.6% identified as "Asian

American.” Two individuals elected not to answer, and one identified as “Other.” The median level of education of participants was that of having earned a bachelor’s degree (or four-year equivalent).

4.2 Measures

4.2.1 Outcome Measures - Current and ideal muscularity. After providing informed consent, participants’ current and ideal muscularity was measured with Frederick and Haselton’s (2007) 8-point silhouette measure (see Appendix 2). Respondents were first asked to indicate which image in the silhouette measure “most closely reflects your current level of muscularity (NOT body type or fat deposition)” by choosing the number corresponded to the appropriate image. Participants were then asked to indicate on the same silhouette measure which image reflected their desired level of muscularity for “a short-term sexual relationship,” followed by an item on desired level of muscularity for “a long-term relationship (e.g., marriage).” Lastly, participants were asked to indicate using the same silhouette measure (in two separate items) their perception of what women would prefer in men in terms of muscularity for a short-term and a long-term relationship. With this silhouette measure, a value of 1 indicates a slender and non-muscular body type, and a value of 8 indicates slender and extremely muscular. For all values in between, larger values indicate preference for a more muscular body type. The five items were presented in random orders.

4.2.2 Life History Strategy. Measures of LH strategies were adapted from Richardson, Dariotis, and Lai (2017), who identified two factors of LH strategies: super-*K* and mating competition. The super-*K* factor includes items such as agreeableness, depression, and health, and the mating-competition factor includes items such as impulsiveness, attitudes towards risk, and sociosexuality. From each factor, we chose items that did not cross load and had relatively

high factor loadings, including depression (.64), sociosexual orientation (.40) (willingness to engage in sexual activity outside of a committed relationship; promiscuity), impulsiveness (.87) (tendency to act on a whim; taking actions without consideration of consequences or outcomes), and attitudes towards risk (.61).

4.2.2.1 Super-K – Depression. Respondents were then asked to complete a 20-item measure of depression adapted from Richardson et al. (2017). With this measure, participants were asked to recall how many times they felt certain ways (e.g., I did not feel like eating) in the past seven days on a four-point scale (1 *rarely or none of the time (less than 1 day)*, 4 *most or all of the time (5-7 days)*). After reverse-coding, the measure showed strong internal consistency (Cronbach's $\alpha = .95$), with higher values indicating higher levels of depression.

4.2.2.2 Mate Competition - Sociosexuality. Following (Tybur, Inbar, Güler, & Mohlo, 2015), sociosexuality was measured with the attitude subscale of the R-SOI (1 *strongly disagree*, 9 *strongly agree*; Penke & Asendorpf, 2008). After reverse coding, the items formed a measure of mating orientation with acceptable reliability ($\alpha = .60$). Higher values indicate greater promiscuity.

4.2.2.3 Mate Competition - Substance use. In this research, I only used items on men's alcohol and tobacco consumption and excluded items on use of illicit materials. This is because I did not want to prompt respondents to potentially admit to illegal activities, which may have affected the data. Previous research showed that use of alcohol and tobacco reliably indicates men's mating strategy (Vincke, 2016). Respondents were asked to provide a numerical estimate for the following behaviors: 1) "In the last 30 days, how many times did you engage in binge drinking (= 5 or more drinks in two hours?),", 2) "How many drinks do you have in an average week?," 3) "In the last 30 days, how often did you use tobacco products?," 4) "What is your

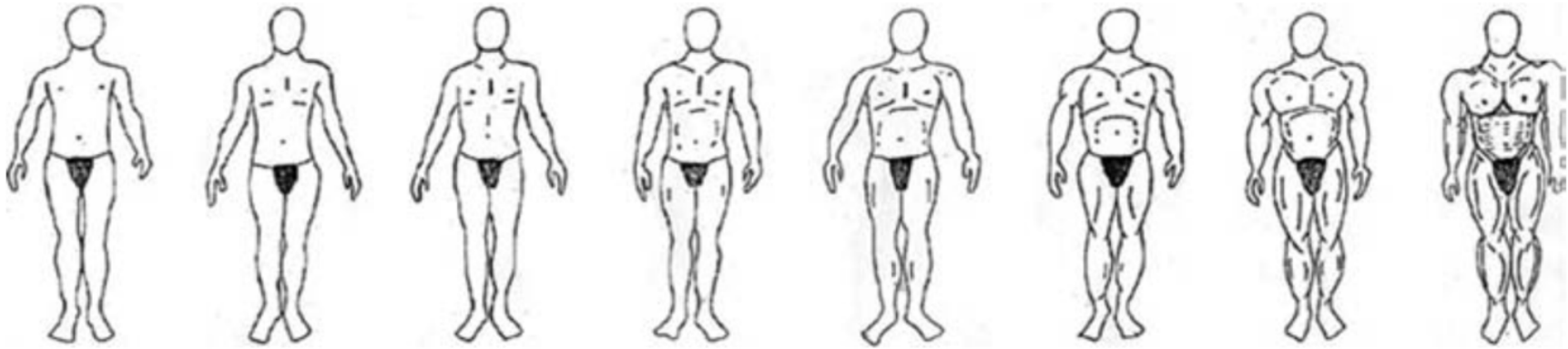
average tobacco use in a typical week)?” Median monthly binge-consumption of alcohol was zero (but ranged from 0 to 30), median weekly alcohol consumption was also zero (ranging from 0 to 10). Median monthly tobacco use was zero (ranging from 0 to 300), median weekly tobacco use was also zero (ranging from 0 to 200). Scores of the four items were normalized to 0-1's, and were averaged to form an index of substance use ($\alpha = .53$), with higher values indicating greater consumption of alcohol and tobacco.

4.2.2.4 Mate Competition - Risk Taking. To render the survey economical, I excluded most items from the risk assessment scale (which contains 34 items; Franken, Gibson, & Rowland, 1991) that did not contain the word “risk.” This left us with an 11-item scale, with an example item being “I like to risk large sums of money” (1 *not like me*, 5 *like me*). The scale is highly reliable ($\alpha = .93$), with higher values indicating greater risk-taking tendencies.

4.2.2.5 Mate Competition - Impulsiveness. Impulsiveness was measured with five items from Eysenck and Eysenck (1978). An example item is “I often get into jams because I do things without thinking” (1 *not very characteristic of me*, 10 *very characteristic of me*). The five items formed a reliable index ($\alpha = .92$), with higher values indicating greater impulsiveness.

In sum, sociosexuality, substance use, risk assessment, and impulsiveness are indicators of the mate competition factor, and depression is an indicator of the super-*K* factor. Higher values of mate competition and of super-*K* both indicate a fast LH strategy.

Figure 1. Muscle Silhouette Measure (Frederick & Haselton, 2007)



Chapter 5: Results

5.1 Data preparation

Descriptive statistics and intercorrelations were presented in Table 1. The logarithm transformation (with base 10) was used to correct for the extreme skew ($Z > 3$) of the depression variable. For hypothesis testing, participants' current muscularity scores were subtracted from their desired muscularity scores (respectively for short-term and long-term relationships), and the two difference scores were used as the main outcome measures. Creating the difference scores controlled for the fact that respondents differed in their current muscularity level, and the difference scores provide a measure of desire (i.e., preferred muscularity level relative to baseline).

5.2 Hypothesis testing. It is predicted that men who adopt a faster LH strategy will desire more muscular bodies, especially for short-term relationships. To test this hypothesis, desires of muscularity (relative to baseline) for short-term and long-term relationships were predicted in two separate ordinary least squared (OLS) regression models from all measures of LH strategy. These include depression ("super- K "), sociosexuality, impulsiveness, substance use, and risk attitudes (all measuring mating competition). In both models, men's perception of women's muscularity preference for the corresponding type of relationship was also controlled for. This allows for an analysis of participants' desired muscularity independent of perceptions of female preference, thus enabling a purer investigation of muscularity preferences as predicted by life history. Results are summarized in Table 3.

The focal hypothesis is that men who subscribe to a fast life history strategy will prefer to be more muscular. Failing to support this hypothesis, there is no evidence that any indicators of mating competition correlated with muscularity desires for either type of relationships (see

Model 1, Table 3). The effect size for SOI-R and impulsivity were very small (.09 and .05 respectively). The correlation between risk prone is opposite to the direction of the prediction (-.12). The correlation of substance use and desire for muscularity, while not significant, was in the predicted direction (.15). Supporting the hypothesis, higher levels of depression (indicating a fast LH strategy) significantly correlated with stronger desires for muscularity for short-term relationships (see Model 2, Table 3). I did not expect any significant correlations between life history measures and desire for muscularity for a long-term relationship. Indeed, there were no significant correlations in Model 2.

Table 1. *Descriptive statistics*

	<i>M</i>	<i>SD</i>
1. SOI-R	6.49	1.77
2. Impulsivity	2.59	2.16
3. Risk	2.24	0.93
4. Substance Use	0.07	0.11
5. Depression(log)	0.19	0.15
6. Women (short)	5.37	1.33
7. Women (long)	4.51	1.13
8. Ideal (short)	4.83	1.42
9. Ideal (long)	4.33	1.05
10. Differ (short)	1.46	1.44
11. Differ (long)	0.96	1.26

Table 2. *Intercorrelations*

	1	2	3	4	5	6	7	8	9	10
1. SOI-R	-									
2. Impulsivity	0.14	-								
3. Risk	0.38**	0.58**	-							
4. Substance Use	0.14	0.13	0.24*	-						
5. Depression(log)	-0.12	0.40**	0.21*	-0.04	-					
6. Women (short)	-0.08	-0.12	-0.14	-0.21*	-0.01	-				
7. Women (long)	-0.13	-0.00	-0.10	-0.12	-0.05	0.41**	-			
8. Ideal (short)	-0.11	0.11	0.06	0.05	0.09	0.44**	0.31**	-		
9. Ideal (long)	-0.06	0.07	-0.03	-0.12	-0.07	0.20**	0.48**	0.47	-	
10. Differ (short)	0.12	0.09	-0.01	0.05	0.29**	0.35**	0.10	0.61**	0.09	-
11. Differ (long)	-0.03	0.04	-0.12	-0.09	0.17	0.07	0.16	-0.04	0.41**	0.53**

Note: SOI-R is sociosexual orientation, “Women (short)” represents subjects’ perceptions of the ideal muscularity as perceived by women for a short-term relationship, “Women (long)” represents subjects’ perceptions of the ideal muscularity as perceived by women for a long-term relationship, “Ideal (short)” represents subjects’ ideal muscularity for a short-term relationship, “Ideal (long)” represents subjects’ ideal muscularity for a long-term relationship, “Differ (short)” is the difference between subjects’ ideal muscularity for a short-term relationship and their current muscularity, and “Differ (long)” is the difference between subjects’ ideal muscularity for a long-term relationship and their current muscularity. * = $p < .05$; ** = $p < .01$

Table 3. *Results of regression models predicting preference for muscularity from life history measures*

	Short-term Relationship (Model 1)			Long-term Relationship (Model 2)		
	<i>B</i>	<i>SE B</i>	β	<i>B</i>	<i>SE B</i>	β
SOI-R	0.08	0.08	0.09	0.07	0.08	0.10
Impulsivity	0.03	0.08	0.05	0.04	0.08	0.07
Risk	-0.19	0.19	-0.12	-0.30	0.18	-0.22
Substance	1.89	1.20	0.15	-0.43	1.15	-0.04
Depression(log)	3.12	1.00	0.31**	1.74	0.95	0.20
Woman (short)	0.42	0.11	0.39**	-0.02	0.10	-0.02
Woman (long)	-0.03	0.13	-0.02	0.18	0.12	0.16
R^2	0.24			0.09		

Note: SOI-R is sociosexual orientation, “Women (short)” represents subjects’ perceptions of the ideal muscularity as perceived by women for a short-term relationship, “Women (long)” represents subjects’ perceptions of the ideal muscularity as perceived by women for a long-term relationship. Model 1 predicts subjects’ desire for muscularity for the purposes of a short-term relationship, and Model 2 predicts subjects’ desire for muscularity for the purposes of a long-term relationship. * = $p < .05$; ** = $p < .01$

Chapter 6: Discussion

The goal of this thesis research was to examine whether LH theory, an evolutionary biological theory, can be used to study human psychology related to self-presentation. To do so, I used men's desire to appear more, or less, muscular as a test case, and assessed whether American men's LH strategy correlates with their desired level of body muscularity depending on mating contexts. I hypothesized that men with faster LH strategies would prefer more muscular body types (relative to their current muscularity level, and this hypothesis is supported when depression was used as a measure of LH strategies but not when mate competition (e.g., SOI-R, sensation seeking) was used as a measure of LH strategies. Specifically, there is no evidence that any measures of mating competition positively correlated with preferences for body muscularity for either short- or long-term relationships. However, stronger depression, indicating a faster LH strategy (Richardson et al., 2017), significantly correlated with stronger preference for a muscular body type when participants are considering a short-term sexual relationship, but not when participants were considering a long-term relationship. Importantly, the correlation between depression and muscularity preference for short-term relationships remained significant after measures of mating competition (SOI-R, impulsiveness, and attitudes towards risk) and super-*K* (depression) are controlled for through the use of the two OLS regression models.

6.1 Implications for Research on Self-Presentation

To my knowledge, this study is the first to apply evolutionary theories to study self-presentation motives, and it thus complements the previous sociological and social psychological approaches to studying self-presentation. Specifically, Goffman (1956) described people's tendency to behave according to socially defined expectations or in a manner that conforms to an

ideal self. Baumeister (1982) argued that people present themselves in different ways to entertain or conform to audience expectations. In other words, both Goffman and Baumeister argued that people present themselves to meet their ideals, regardless of these ideals are internally or externally generated. However, neither Goffman (1956) nor Baumeister (1982) specified the content of an ideal self. They both suggest ideal selves are shaped by expectations, but such a claim is limited in its predictive capabilities. Leary and Kowalski (1990) provided a two-part model of self-presentation, which posits that motivation is derived from the goal-relevance of the impression (or the salience of the impression given off in relation to the individual's goal within the interaction), how important the goal is, and the discrepancy between the current image and desired impression. However, similar to previous research, Leary and Kowalski's model is unable to predict what motivates the goals of the individual. Instead, self-presentation is motivated by social factors pertaining to the immediate context. In comparison, Jones and Pittman (1982) are more specific in articulating the goals of self-presentation and the strategies to achieve those goals. For example, as described in Introduction, self-promotion strategies can entail behaviors such as explicitly describing what qualities make the individual appear competent. Similarly, Frederick and Haselton's (2007) research suggests muscularity in men is considered an attractive trait, which in turn suggests that men who desire to be considered attractive would be motivated to attain a more muscular physique.

Life history theory complements the above theoretical approaches in two senses. First, it describes a very specific goal, which is ultimately to reproduce. Reproduction in this context is not just the physical act of procreation, but life history also predicts how rearing environment shapes behavioral strategies later in life. According to LH theory, variances of behavioral patterns are afforded to focusing on immediate survival and increased competitiveness or

maximizing immediate numbers of offspring. Second, LH theory provides a mechanism that allows researchers to predict the strategies of behavior. This particular study was interested in how men presented themselves (or desired to present themselves) as more or less muscular. LH theory suggests that variation in preference for being muscular can be predicted by personal (i.e., sociosexual orientation, impulsiveness, attitude toward risk, and depression) and environmental (rearing environment) characteristics. The results of this study suggest an underlying factor (LH strategy) that can partially predict the extent men are motivated to present themselves as muscular.

More importantly, the LH hypothesis presented in this thesis provides an example of how a theory can help define in the context of self-presentation research what an ideal self is. Most theories reviewed previously suggest that people ultimately self-present to conform to an ideal self, but previous researchers are vague in describing what is idealized, or if there is an underlying pattern predicting what traits are idealized. According to the LH perspective, an ideal self is the set of characteristics about self that put the self in an advantageous position in passing along genes to the next generation relative to rivals. It should be noted that I currently do not have evidence supporting this definition, and the hypothesis remains to be tested more rigorously. For example, if the hypothesis of this thesis is correct (that faster men would prefer a more muscular body type), then mating competition should predict the preference for muscularity. The hypothesized relationship between mating competition and preference for muscularity was unsupported, and there could be several reasons for this. Firstly, the instruments used may not be the best measures of a mating competition factor. The only instrument that specifically dealt with mating behaviors and preferences at all was an abridged sociosexual orientation measure. To more appropriately test the effect of mating competition on preference

for muscularity, more detailed instruments should be used. Similarly, mating competition may be a variable that works best when a threat is primed. It is possible that participants may score differently when primed with a situation that would elicit feelings of jealousy, perhaps resulting in a truer measure of mating competition. In sum, LH offers a means to fill that predictive void, suggesting a pattern describing the reasons individuals select the strategies they do (in the case of Jones and Pittman) as well as predicting how an individual may implement said selected strategies. These data collected in this study extend understanding of self-presentation motivations in the context of male's desire to be muscular in an effort to explain the reasons why muscularity is a desirable trait as well as why there exists variation in this motivation, or at least the degree an individual is motivated. To be specific, this study suggests that men are motivated to appear muscular not only due to perceptions of what is considered attractive, but other factors related to his life history, namely depression, and this prediction is partially supported. Thus, the finding of this research complements previous explanations by previous self-presentation researchers (e.g., Jones & Pittman, 1982). In essence, this study not only corroborates previous motives of self-presentation suggesting the audience's values affect how an individual chooses to present oneself (e.g., Leary & Kowalsky, 1990), but extends that motivation and provides at least a partial explanation as to how those audience analyses affect our motivations.

6.2 Implications for Human Sexual Selection Research

This study offers insight into human sexual selection research on men's motive to be more, or less, muscular. Frederick and Haselton (2007) emphasized the role of female choice by predicting an optimum level of male muscularity that would be perceived as attractive to women. However, they did not examine men's preference for muscularity body types (i.e., self-presentation motives), but if we take their logic further, we can deduce a female-choice

hypothesis on men's preference for muscularity. That is, if female choice is a primary mechanism of human sexual selection, variation of muscularity would follow the inverted-U pattern as observed by Frederick and Haselton (2007). This study complements their findings by testing a male-contest hypothesis on men's muscularity preference above and beyond the effect of female choice.

As hypothesized in this paper, according to LH theory, men adopting a fast LH strategy would benefit from ability to survive and thrive in high-risk, high-reward situations (that typically characterize male-male competition). Puts (2010), a mating competition mechanism of human sexual selection would suggest individuals who can physically compete most adeptly in intrasexual competition would have the greatest reproductive success (have greater access to females). Greater muscularity would allow for greater abilities for intrasexual competitions, and thus would be beneficial, specifically, to faster LH strategists, which is predicted by this study. It would benefit fast LH individuals to prefer greater muscularity, more so than slow LH strategists. While my data did not support the motivation for such a prediction (there was no support for a correlation between mating competition and desire for muscularity), there could be a number of factors that influenced that.

To recap, the hypothesis of this thesis is founded under the assumption that greater muscularity allows for greater reproductive success for fast LH strategists. This hypothesis is largely inspired by Puts' (2010) argument that intrasexual competition is a significant factor in human sexual selection behaviors. Specifically, muscularity allows for greater ability to physically fight other males, while reducing the likelihood of incurring damage on the self. If mating competition is a significant factor in human sexual selection behaviors, as Puts' argument suggests, then preference for muscularity would allow for more reproductive opportunities, and

thus benefits fast LH individuals. However, this study provides no support that male mating completion motivates preference for muscularity. This does not necessarily mean that Puts' arguments are incorrect. As described, it is possible that the chosen instruments did not adequately measure or prime mating competition, and thus, were inaccurate. Further, men, on average, desired greater muscularity irrespective of mating competition factors. This suggests that female choice is not the "correct" motivation of sexual dimorphism in humans either. More research is necessary to provide support to a primary mechanism of human sexual selection.

6.3 Implications for Human Life History Research

While previous life history research has looked at human values, religiosity, mate selection tendencies, personality, and other behavioral patterns, I have extended this research into a new domain of human interaction, namely how people present themselves. This research suggests that LH factors, more than mating competition variables, are stronger predictors of how men would prefer to present themselves (for the purposes of a short-term relationship). Further exploration into this avenue of research can help inform evolutionary explanations as to how and why people (not just men) make the self-presentation decisions that they do.

It is interesting to speculate why depression relates to preference for muscularity in a short-term mating context but not in the long-term mating context. It suggests that men are not particularly concerned with their muscularity when thinking about long-term relationships across both fast and slow LH strategies. It is possible that this evidence only provides a proximate explanation; if there is a sizeable gap between one's current and ideal muscularity, that may lead to negative self-evaluation and depression. On the other hand, pre-existing negative evaluations and depression about oneself can lead to a greater discrepancy between one's current and ideal muscularity, which can also explain why depression is correlated with muscularity preference in

the observed manner. However, the tested hypothesis describes and predicts an ultimate explanation. It is important to note that proximate and ultimate explanations for a behavior are not mutually exclusive. In this context, an ultimate explanation seeks to explain the underlying condition(s) under which a certain behavior is beneficial. Depression is measured as an outcome of a fast life history associated with super-*K* because super-*K* specifically deals with resource allocation into somatic function. Resource investment into somatic function suggests a slow life history strategy. The argument presented is that depression demotivates the individual from investing resources in one's own growth, which, in turn, suggests a fast life history strategy. For instance, the individual may consider himself to not be as muscular as would be ideal (leading to a greater perceived disparity between actual and desired levels). Another possibility is that desire for muscularity and depression could be more cyclical, and may be a biological manifestation of motivation at work: depression causes an individual to consider a greater disparity between current and ideal muscularity, creating the motivation to exercise and build muscle. Exercising and building muscle releases endorphins and dopamine, hormones related with feelings of happiness which could counteract the effects of depression. The desire of a higher level of muscularity could function as extra motivation for the individual to engage in an activity that would reduce depression.

6.4 Limitations

One of the biggest limitations of this study was the sample. For logistical and argument purposes, only males were of interest for this study, while not accounting for or making any predictions as to the tendencies of women and women's preferences. Future studies should examine female preferences. While there is some research that has examined the ovulation cycle as it pertains to muscle preferences in potential mates (e.g., Gangestad, Thornhill, & Garver-

Apgar, 2005), once again, there is minimal research examining how women would prefer to present themselves in the contexts described in this paper. Though Puts (2010) argued that women experience a slightly different style of intrasexual competition than men (rarely coming to physical blows, instead relying on social consequences as “combat” and manipulation of male preferences), the results of this paper suggest that mate choice, as well as super-k indicators, are predictive of idealizing traits that enable a fast LH strategy. I would predict that women with a fast LH strategy would prefer physical features indicative of fertility and genetic quality (i.e., lower waist-hip ratio, larger breasts) for the purposes of a short-term relationship. Further, there were some demographic questions that could assist in further analysis that were not addressed. For example, respondents’ relational status was not requested. A respondent in a relationship may not prioritize muscularity as much a respondent who is single because, according to the literature, he would have less reason to compete for sexual opportunity and attract mates. Respondents’ sexual orientation was also not requested. It is unclear whether homosexual males would be motivated to strategically invest in muscularity growth, and is certainly of interest for future research. Education level was also not assessed. However, education level of parents is often used as an outcome measure positively indicative of a slow life history strategy (e.g., Richardson, Dariotis, & Lai, 2017). It can be assumed that individuals who invest resources into an intellectual or cognitive effort have a slower life history strategy. All three of these variables could be possible moderators of the hypothesized relationship that were unaccounted for.

Another limiting factor of the study was the operationalization used to measure participants’ muscularity for the different conditions. The muscular silhouette measure is a useful, reliable tool for examining perceptions relating to muscularity, but it is not a realistic depiction of the male form. Particularly for the higher end of the scale, the figures depicting great

muscularity, those forms might just be considered unattractively drawn, rather than a degree of unattractiveness relating to the muscularity. The measure also lacks meaningful, measurable distinctions between each form, leading to difficulties applying these findings to real people. Fundamentally, the issue is lack of detail, which could be addressed through an avatar creation software program, allowing for greater control over the variation in muscularity, while also enabling control over other aspects of the, such as facial features and hairstyles.

Another limitation of the muscular silhouette measure pertains to the control the participant has over the silhouette itself. For example, with questions such as identify your currently muscularity, individuals with body types that do not fit the silhouette measure may have difficulty relating to and selecting an appropriate silhouette. A way to avoid this potential problem is to enable participants themselves to create an avatar that would represent their ideal forms, which could be manipulated by describing the goal of the game that would be played beyond the avatar creation. For both of the described limitations relating to the muscular silhouette measure, I would expect similar outcomes as observed in the current research.

The indicators of life history that were measured may not have been the strongest of predictors for a specific life history strategy. The measures were selected for based on their factor loadings in a previous study (Richardson, Dariotis, & Lai, 2017), and while they were comparatively high, factor loading scores, besides impulsivity (sensation seeking) were between .4 and .64, suggesting only moderate predictive value. This may have led to the lack of support for the mate competition hypothesis. Future studies should investigate more accurate measures of mate competition indicators.

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Appendix 1

Revised Sociosexual Orientation Inventory (Attitudinal) (Penke, 2013)

Please indicate how much you agree or disagree with the following statements (1 *Strongly Disagree*; 7 *Strongly Agree*).

1. Sex without love is ok.
2. I can imagine myself being comfortable and enjoying “casual” sex with different partners.
3. I do NOT want to have sex with a person until I am sure that we have a long-term, serious relationship.

Appendix 2

Impulsiveness (Eysenck & Eysenck, 1978)

Please indicate to what degree each of the following statements are characteristic of your personality (1 *not very characteristic of me*; 10 *very characteristic of me*).

1. I do things in the spur of the moment.
2. I do and say things without stopping to think.
3. I am an impulsive person.
4. I often get into jams because I do things without thinking.
5. I often get so “carried away” by new and exciting ideas that I never think of possible snags (difficulties).

Appendix 3

Substance Use (Richardson, Dariotis, & Lai, 2017)

1. In the last 30 days, how many times did you engage in binge drinking (5 or more drinks in two hours)? (please type a numerical value).
2. How many drinks do you have in an average week? (please type a numerical value)
3. In the last 30 days, how often did you use tobacco products? (please type a numerical value)
4. What is your average tobacco use in a typical week? (please type a numerical value)

Appendix 4

Attitudes Towards Risk (Franken, Gibson, & Rowland, 1992)

Please indicate the degree to which the following statements describe you (1 *not like me*; 5 *like me*).

1. I like the feeling that comes with taking physical risks.
2. I like the feeling that comes with taking psychological or social risks.
3. While I don't deliberately seek out situations or activities that involve physical risk, I often end up doing things that involve physical risk.
4. I like to risk large sums of money.
5. I would be willing to risk my life to receive 10 million dollars.
6. I consider myself a risk-taker.
7. The greater the risk, the more fun the activity.
8. I do not let the fact that something is considered immoral stop me from doing it.
9. I often think about doing activities that involve physical risk.
10. I often think about doing activities that involve social risk.
11. I do not let the fact that something is illegal stop me from doing it.

Appendix 5

Questions Addressing Muscularity

1. How satisfied are you with your currently level of muscularity (1 *extremely dissatisfied*; 7 *extremely satisfied*)?
2. How much effort do you invest in attaining or maintaining your current level of muscularity (1 *none at all*; 5 *a great deal*)?

Appendix 6

Depressive Symptoms (Radloff, 1977)

Below is a list of ways you might have felt or behaved. Please indicate how often you felt this way during the past week (7 days).

1. I was bothered by things that don't usually bother me.
2. I did not feel like eating; my appetite was poor.
3. I felt that I could not shake off the blues even with help from my family or friends.
4. I felt I was just as good as other people.
5. I had trouble keeping my mind on what I was doing.
6. I felt depressed.
7. I felt that everything I did was an effort.
8. I felt hopeful about the future.
9. I thought that my life had been a failure.
10. I felt fearful.
11. My sleep was restless.
12. I was happy.
13. I talked less than usual.
14. I felt lonely.
15. People were unfriendly.
16. I enjoyed life.
17. I had crying spells.
18. I felt sad.
19. I felt that people dislike me.

20. I could not get “going.”